1475

4

SMC ENVIRONMENTAL SERVICES GROUP
900 W. Valley Forge Rd. P.O. Box 859
VALLEY FORGE, PENNSYLVANIA 19482

(215) 265-2700

LETTER OF TRANSMITTAL

ORIGINAL (Red)

DATE 5/2/91 JOB NO. 9123-90011

ATTENTION David Byro

RE Ruetgers-Nease Chemical Co.
State College RI/FS

TO USEPA Region III
841 Chestnut Building
3HW21
Philadelphia, PA 19107

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1	3/18/91		Quality Assurance Review
1			CLP Data Packages for Surface Water and Depth Discrete Soil Samples

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☑ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

AR302553

COPY TO Mr. Jack Wagner, PaDER
Mr. Steven W. Foard, P.E. - Ruetgers-Nease
File

SIGNED: Bryan D Sr

If enclosures are not as noted, kindly notify us at once

PAGE LEFT INTENTIONALLY BLANK

Environmental Standards, Inc.
... 1220 Valley Forge Rd.
... (215) 935-5577

QUALITY ASSURANCE REVIEW OF THE

RUETGERS-NEASE CHEMICAL COMPANY, INC.

STATE COLLEGE, PA SITE

March 18, 1991

Prepared for:

SMC ENVIRONMENTAL SERVICES
501 Allendale Road
King of Prussia, PA 19406

Prepared by:

ENVIRONMENTAL STANDARDS, INC.
1220 Valley Forge Road
P.O. Box 911
Valley Forge, PA 19481

AR302555

TABLE OF CONTENTS

ORIGINAL
(Red)

Introduction

This quality assurance review is based upon a review of all data generated from the 8 surface water samples, 13 soil boring samples and 10 aqueous field blank and trip blank samples that were collected during January 1991 for the Ruetgers-Nease Chemical Company, Inc. State College Site. The samples that have undergone a rigorous quality assurance review are listed on Table 1. The data packages were received in 5 distinct Sample Delivery Groups (SDGs), as specified on Table 1.

This review has been performed with guidance from the "Functional Guidelines for Evaluating Organics Analyses With Modifications for Use Within Region III" (U.S. EPA, 1988).

The reported analytical results are presented as a summary of the data in Section 2. All of the analytical data were examined to determine contractual compliance relative to the analytical requirements and deliverables specified in the U.S. EPA Contract Laboratory Program (CLP) protocol and/or the project-specific Standard Operating Procedures (SOPs) for mirex and kepone. Qualifier codes have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of any result. Details of this quality assurance review are presented in the narrative section of this report. This report was prepared to provide a critical review of the laboratory analyses and reported analytical results. Rigorous quality assurance reviews of laboratory-generated data routinely identify various problems associated with analytical measurements, even from the most experienced and capable laboratories. The nature and extent of problems identified in this critical review should not be interpreted to mean that those results that do not have qualifier codes are less than valid.

TABLE 1

ORIGINAL (Red)

SAMPLES INCLUDED IN THIS QUALITY ASSURANCE REVIEW

SMC Environmental Services Sample Number	Laboratory Sample Number	Case Number/ SDG	Date of Sample Collection	Fractions Examined
27-1-7-91-SW1	7980-01	0111/SDG01	1/7/91	V,M,K
28-1-7-91-MS-SW1	7980-01MS	0111/SDG01	1/7/91	V,M,K
29-1-7-91-MSD-SW1	7980-01MSD	0111/SDG01	1/7/91	V,M,K
30-1-7-91-SW2	7980-02	0111/SDG01	1/7/91	V,M,K
33-1-7-91-SW3	7980-03	0111/SDG01	1/7/91	V,M,K
32-1-7-91-SW4	7980-04	0111/SDG01	1/7/91	V,M,K
34-1-7-91-SW5	7980-05	0111/SDG01	1/7/91	V,M,K
31-1-7-91-SW6	7980-06	0111/SDG01	1/7/91	V,M,K
26-1-7-91-FB	7980-07	0111/SDG01	1/7/91	V,M,K
35-1-7-91-TB	7980-08	0111/SDG01	1/7/91	V
49-1-9-91-SB8-A	7983-01	0116/SDG01	1/9/91	V,M,K
50-1-9-91-SB8-B	7983-02	0116/SDG01	1/9/91	V,M,K
51-1-9-91-SB8-C	7983-03	0116/SDG01	1/9/91	V,M,K
48-1-9-91-SB8-FB	7983-04	0116/SDG01	1/9/91	V,M,K
52-1-9-91-TB	7983-05	0116/SDG01	1/9/91	V
53-1-10-91-SB5-A	7994-01	0116/SDG02	1/10/91	V,M,K
54-1-10-91-SB5-B	7994-02	0116/SDG02	1/10/91	V,M,K
55-1-10-91-FB	7994-03	0116/SDG02	1/10/91	V,M,K
56-1-10-91-TB	7994-04	0116/SDG02	1/10/91	V
57-SB3-A	8016-01	0116/SDG03	1/15/91	V,M,K
58-SB3-B	8016-02	0116/SDG03	1/15/91	V,M,K
59-SB3-C	8016-03	0116/SDG03	1/15/91	V,M,K
60-SB6-A	8016-04	0116/SDG03	1/15/91	V,M,K
61-SB6-B	8016-05	0116/SDG03	1/15/91	V,M,K
62-FB	8016-06	0116/SDG03	1/15/91	M,K

TABLE 1 (Cont.)

SMC Environmental Services Sample Number	Laboratory Sample Number	Case Number/ SDG	Date of Sample Collection	Fractions Examined
63-TB	8016-07	0116/SDG03	1/15/91	V
64-SB2-A	8037-01	0117/SDG01	1/16/91	V,S,M,K
65-SB2-B	8037-02	0117/SDG01	1/16/91	V,M,K
66-SB2-C	8037-03	0117/SDG01	1/16/91	V,M,K
67-FB	8037-04	0117/SDG01	1/16/91	V,S,M,K
68-TB	8037-05	0117/SDG01	1/16/91	V

ORIGINAL (Red)

NOTES:

V - TCL Volatiles
S - TCL Semivolatiles
M - Mirex
K - Kepone

Section 1 Quality Assurance Review

A. Data Evaluation

The organic analyses of 8 surface water samples, 13 soil boring samples and 10 aqueous field blank and trip blank samples were performed by Enseco-ERCO Laboratory of Cambridge, Massachusetts. The samples were collectively analyzed for the Target Compound List (TCL) volatiles and TCL semivolatiles by CLP protocols and for mirex and kepone utilizing the project-specific analytical SOPs. The findings in this report are based upon a rigorous review of holding times, blank analysis results, surrogate recoveries, matrix spike recoveries, GC/MS tuning, target compound matching quality, isotope ratios, calibrations, internal standard areas, system performance and quantitation of positive results. The analytical results are provided in Section 2 of this report.

Overall, the organic data was good. Contractual criteria and reporting requirements were met for this data set, with the exception of the following. It should be emphasized that the following items are contractual in nature and do not necessarily affect data usability. Usability is addressed separately.

Correctable Deficiencies

1. The entire SMC Environmental Services sample identifications were not used on any of the QC forms or raw data for Case 0111/SDG01, Case 0116/SDG01 and Case 0116/SDG02. Instead, the laboratory abbreviated all of the sample identifications.

2. A peak with a retention time of approximately 4 minutes was observed in the volatile chromatograms of all samples. This peak appears to be greater than 10% of the area of the closest internal standard, it was not library searched as required. Although this peak is most likely a laboratory artifact [methanol and/or an air leak (CO_2)], the laboratory is still required to perform a library search.

3. According to the Chain-of-Custodies provided, it appears that the laboratory misidentified sample 53-1-10-91-SB5-A as 53-SB5-B on all of the VOA QC Forms.

4. The library search for the TIC with a retention time of 12.89 minutes in the volatile fraction of sample 53-1-10-91-SB5-A was not included in the data package provided.

5. The mass spectrum for ethylbenzene reported in sample 57-SB3-A and for styrene reported in sample 58-SB3-B were not included in the data package provided.

6. The laboratory reported the presence of methylene chloride in the volatile laboratory method blank VBLK02 (Case 0117/SDG01) at a concentration of 5 μg/L. According to the raw data provided, the observed concentration of methylene chloride in method blank VBLK02 is 6 μg/L.

7. The following peaks appear to be greater than 10 percent of the area of the nearest internal standard and should have been library searched.

Sample	Fraction	Retention Time of Peak (min.)
50-1-9-91-SB8-B	VOA	24
53-1-10-91-SB5-A	VOA	34
54-1-10-91-SB5-B	VOA	34 and 38
58-SB3-B	VOA	29.5
59-SB3-C	VOA	29.5
61-SB6-B	VOA	27.5
VBLK05 (Case 0116/SDG03)	VOA	28
VBLK02 (Case 0117/SDG01)	VOA	28
64-SB2-A	VOA	32 and 34
68-TB	VOA	29
67-FB	BNA	7.5

8. The percent relative abundance values for the following mass ions are misreported on the Form V's associated with the following BFB tunes. Although the values observed in the raw data differ by 0.1 percent, the percent relative abundances were still met with respect to the CLP acceptance criteria.

Instrument	Tune Date/Time	Mass Ion (m/z)	Reported % Relative Abundance	Observed % Relative Abundance
MS-V3	1/11/91 at 08:57	176	76.1%	76.2%
MS-V3	1/11/91 at 08:57	177	5.3%	5.4%
MS-V3	1/14/91 at 20:17	177	4.8%	4.7%
MS-V3	1/13/91 at 08:56	176	77.6%	77.7%
MS-V2	1/13/91 at 08:40	175	7.3%	7.4%
MS-V2	1/13/91 at 08:40	177	6.0%	6.1%
MS-V3	1/14/91 at 09:48	176	79.8%	79.7%
MS-V1	1/22/91 at 08:23	176	80.3%	80.4%
MS-V2	1/22/91 at 20:37	175	7.1%	7.2%
MS-V3	1/18/91 at 20:27	176	99.1%	99.0%
MS-V3	1/18/91 at 20:27	177	6.6%	6.7%

9. The reported results of "not detected" for mirex and kepone in sample 54-1-10-91-SB5-B (Case 0116/SDG02) are incorrect. Examination of the raw data revealed that mirex (3.05 μg/Kg) and kepone (6.35 μg/Kg) are confidently present in this sample (all quantitative ion ratio criteria were met for this sample for the quantitation as well as the confirmation cluster). Since the concentrations of mirex and kepone were detected at levels less than the quantitation limits, these results should be considered estimated. Accordingly, these results have been added to the data tables with the appropriate "J" qualifier. Documentation of the reviewer's calculations are presented as the last several pages of Section 3, Part C.

10. The Form I's for the laboratory method blanks for the mirex and kepone fraction of the samples in Case 0116/SDG03 were not included in the data package provided.

Noncorrectable Deficiencies

ORIGINAL (Red)

1. The date of sample collection for samples 66-SB2-C, 67-FB and 68-TB appear to be incorrect as reported on the Chain-of-Custody provided. These samples were apparently collected on 1/16/91 instead of 1/19/91.

2. Low recoveries were obtained for all three volatile surrogate compounds in samples 64-SB2-A, 66-SB2-C, 49-1-9-91-SB8-A, 50-1-9-91-SB8-B, 51-1-9-91-SB8-C and 60-SB6-A but these samples were not reanalyzed as required (SOW 288, E-20).

3. According to the laboratory case narrative, the temperature of the cooler containing all fractions of the samples in Case 0117/SDG01 was found to be 7.2°C upon receipt at the laboratory. In addition, the volatile vials for samples 67-FB and 68-TB were observed by laboratory personnel to contain headspace.

4. It appears that the initial and continuing VOA calibrations associated with the medium-level soil analyses of the samples in Case 0116/SDG01 were actually by low-level "water" calibrations. The CLP protocol requires that medium-level calibrations (containing additional methanol to stimulate sample analysis conditions) must be performed (SOW288, D-29). From an analytical viewpoint, although this is technically not consistent with the CLP protocols, this analysis may have actually been more appropriate using the low-level calibration. Since only a very small volume (20 μl) of the methanol extract was utilized for analysis, the low-level water calibration appears to more closely simulate the sample analysis conditions.

5. A volatile, semivolatile, mirex and kepone matrix spike/matrix spike duplicate (MS/MSD) analysis was not performed on any of the 13 soil boring samples in the four sample delivery groups (SDGs) reviewed. In addition, the soil boring samples that were reviewed contained samples analyzed by low-level and medium-level protocol for volatile analysis. Accordingly, a VOA low-level and medium-level MS/MSD analysis should have been performed.

6. According to the raw data provided, the soil boring samples that were analyzed by "medium-level" protocol for volatile organics were not in accordance with the CLP protocol. Per the CLP protocol, 4 grams of sample is extracted with 10 ml of methanol and a portion of the methanol solution is then added to 5 ml of water and is subsequently purged (SOW288, D-27 to D-28). It appears that sample volumes ranging from 5 grams to 10 grams and volumes of methanol ranging from 5 ml to 10 ml were used for the analysis of the project samples included in this review.

7. The mirex and kepone fraction of samples 28-1-7-91-MS-SW1 and 29-1-7-91-MSD-SW1 were extracted 10 days beyond the 5-day SOP holding time from date of sample receipt. It appears that these samples were originally extracted within holding time but because

they were not spiked, the laboratory reextracted and reanalyzed them with the proper spiking solution.

8. The percent difference for kepone was above the maximum percent difference criteria of 40% specified in the project-specific SOP for both the quantitation and confirmation clusters in the continuing calibration standard performed on 1/19/91 at 11:44 (associated with samples in Case 0116/SDG01 and Case 0116/SDG02). Positive results for kepone in samples 51-1-9-91-SB8-C and 53-1-10-91-SB5-A were quantitated using this noncompliant standard.

9. The instrument level of mirex in sample 50-1-9-91-SB8-B was observed to be in excess of the calibrated range. The laboratory diluted and reanalyzed the sample in accordance with the analysis SOP. However, once again the instrument level of mirex exceeded the calibration range. Accordingly, a second dilution should have been performed to properly quantitate the concentration of mirex in this sample.

10. The laboratory quantitated the result for kepone in sample 60-SB6-A using the quantitation ion cluster. However, the ion abundance ratio between the two most abundant ions in the quantitation ion cluster for kepone exceeded the QC limits. The ion abundance ratio between the two most abundant ions in the confirmation cluster for kepone were within QC limits. The laboratory should have then quantitated the result using the confirmation cluster per the site-specific SOP.

Comments

1. According to the case narrative, the pesticide/PCB fraction of samples 64-SB2-A and 67-FB were prepared in accordance with EPA CLP SOW590 rather than the requested EPA CLP SOW288. The pesticide/PCB fraction of these samples were canceled.

2. A secondary dilution was performed for the analysis of kepone and mirex in sample 50-1-9-91-SB8-B. The reported results for kepone and mirex in this sample have been flagged "*" on the data tables. The concentration of mirex obtained in the initial analysis of this sample resulted in instrument levels in excess of the calibration range. Accordingly, the C_{13}-mirex internal standard was diluted out, and additional C_{13}-mirex was added to the diluted extracts just prior to the GC/MS analysis at a concentration of 1ng/μl.

3. According to the Chain-of-Custody provided, sample 62-FB was requested to be analyzed for volatiles. However, it appears that the volatile analysis of this sample was not performed.

With regard to data usability, principal areas of concern include blank contamination, surrogate recoveries, matrix spike recoveries, calibrations and quantitation of positive results. Based upon a review of the data provided, the following data qualifiers are offered.

ORIGINAL (Red)

Data Qualifiers

- Due to the trace level presence of methylene chloride, carbon disulfide, 2-butanone, total xylenes, chlorobenzene, toluene and ethylbenzene in the laboratory method blanks and/or field blanks and trip blanks, the reported presence of these compounds in the following samples is qualitatively questionable and have been flagged "B" on the data tables.

Compound	Applicable Samples
methylene chloride	27-1-7-91-SW1, 49-1-9-91-SB8-A, 53-1-10-91-SB5-A, 54-1-10-91-SB5-B, 57-SB3-A, 57-SB3-ADL, 58-SB3-B, 58-SB3-BDL, 59-SB3-C, 59-SB3-CDL1, 60-SB6-A, 61-SB6-B, 64-SB2-A, 65-SB2-B, 65-SB2-BDL and 66-SB2-C
carbon disulfide	30-1-7-91-SW2, 31-1-7-91-SW6, 33-1-7-91-SW3 and 34-1-7-91-SW5
2-butanone	53-1-10-91-SB5-A, 54-1-10-91-SB5-B, 57-SB3-A, 57-SB3-ADL, 58-SB3-B, 58-SB3-BDL, 59-SB3-C, 59-SB3-CDL1, 60-SB6-A, 64-SB2-A, 65-SB2-B and 66-SB2-C
chlorobenzene	54-1-10-91-SB5-B
toluene	58-SB3-B and 58-SB3-BDL
ethylbenzene	58-SB3-B, 58-SB3-BDL and 60-SB6-A
total xylenes	60-SB6-A

- Although the results for carbon disulfide in sample 34-1-7-91-SW5, for methylene chloride and 2-butanone in samples 57-SB3-A, 57-SB3-ADL, 58-SB3-B, 58-SB3-BDL, 59-SB3-C, 59-SB3-CDL1, 60-SB6-A, 64-SB2-A, 65-SB2-B, 65-SB2-BDL and 66-SB2-C, for toluene in samples 58-SB3-B and 58-SB3-BDL, for ethylbenzene in samples 58-SB3-B, 58-SB3-BDL and 60-SB6-A and for total xylenes in sample 60-SB6-A appear to be substantial, these results actually represent trace level instrument levels multiplied by large dilution factors.

- Although the reported results for toluene and ethylbenzene in sample 57-SB3-ADL and for total xylenes in samples 57-SB3-ADL and 58-SB3-BDL are at concentrations that can be questioned by the blanks, the reviewer has not qualified these results with a "B". The concentrations of these compounds in the initial analyses of the aforementioned samples were substantial enough that they could not be qualitatively questioned.

- Although there is no direct reason to quantitatively question the presence of acetone in samples 34-1-7-91-SW5, 49-1-9-91-SB8-A, 50-1-9-91-SB8-B, 51-1-9-91-SB8-C, 53-1-10-91-SB5-A, 53-1-10-91-SB5-B, 57-SB3-A, 57-SB3-ADL, 58-SB3-B, 59-SB3-C and 61-SB6-B and carbon disulfide in samples 53-1-10-91-SB5-A and 54-1-10-91-SB5-B, these results should be used with caution. Acetone and carbon disulfide are common laboratory contaminants.

- Trace-level concentrations of mirex were detected in field blank sample 62-FB, associated with samples 57-SB3-A, 58-SB3-B, 59-SB3-C, 60-SB6-A and 61-SB6-B (and their dilution analyses.) The detection of mirex in this field blank was not at sufficient concentration to qualitatively question any of the associated sample results.

- The analysis for all VOA compounds reported as "not-detected" in samples 57-SB3-ADL, 58-SB3-BDL, 59-SB3-CDL1, 64-SB2-A and 65-SB2-B should be considered unreliable and has been flagged "R" on the data tables. Similarly, positive results for volatile compounds in these samples should be considered estimated and have been flagged "J" on the data tables. Very low recoveries were obtained for all three volatile surrogate compounds in these samples.

- The analysis for 4-nitroaniline in sample 67-FB is unreliable and has been flagged "R" on the data tables. A low response factor was obtained for 4-nitroaniline in the associated calibration standard.

- The analysis for all VOA compounds reported as "not detected" in samples 67-FB and 68-TB is unreliable and has been flagged "R" on the data tables. Similarly, the positive results for methylene chloride in these two samples should be considered estimated and has been flagged "J" on the data table. According to the case narrative, the VOA sample vials for these samples contained headspace.

- The actual detection limits for all VOA compounds in samples 49-1-9-91-SB8-A, 50-1-9-91-SB8-B, 51-1-9-91-SB8-C, 57-SB3-A, 58-SB3-B, 59-SB3-C and 60-SB6-A may be higher than reported and have been flagged "UL" on the data tables. Similarly, positive results for volatile compounds in these samples should be considered estimated and have been flagged "J" on the data tables. Low recoveries were obtained for all three volatile surrogate compounds in these samples.

- The results for kepone (6.35 μg/Kg) and for mirex (3.05 μg/Kg) in sample 54-1-10-91-SB5-B have been added to the data tables. Examination of the raw data revealed that kepone and mirex are confidently present in this sample (all qualitative ion ratio criteria were met for this sample for the quantitation as well as the confirmation cluster).

- The reported results for the compounds in the following samples should be considered estimated and have been flagged "J" on the data tables. The instrument levels that these results were based on were in excess of the calibrated range.

Compound	Applicable Samples
toluene	57-SB3-A, 59-SB3-C, 59-SB3-CDL1 and 65-SB2-B
total xylenes	58-SB3-B, 59-SB3-C and 59-SB3-CDL1
ethylbenzene	59-SB3-C and 59-SB3-CDL1
1,1,2,2-tetrachloroethane	59-SB3-C
trichloroethene	59-SB3-C
mirex	50-1-9-91-SB8-B

- The results for the compounds in the following samples should be considered estimated and have been flagged "J" on the data tables. High percent differences were obtained between the response factors used to quantitate these results and the average response factors obtained from the initial multi-point calibrations.

Compound	Applicable Samples
acetone	49-1-9-91-SB8-A, 50-1-9-91-SB8-B, 51-1-9-91-SB8-C and 57-SB3-ADL
kepone	53-1-10-91-SB5-A and 51-1-9-91-SB8-C

- The positive results for mirex in samples 32-1-7-91-SW4 and 62-SB1 and for kepone in samples 59-SB3-C and 51-1-9-91-SB8-C should be considered estimated and have been

flagged "J" on the data tables. The relative ion abundance ratios for the two most abundant ions in the quantitation ion clusters exceeded the QC limits for the aforementioned compounds in these samples. It should be noted that the relative ion abundance ratios for the two most abundant ions in the confirmation ion clusters also exceeded QC limits.

- The positive result for kepone in sample 51-1-9-91-SB8-C should be considered estimated and has been flagged "J" on the data tables. This result is estimated due to an interference.

- The reported result for kepone in sample 60-SB6-A has been changed on the data tables. The laboratory quantitated the result for kepone (0.584 μg/Kg) using the quantitation ion cluster, yet the ion abundance ratio for the quantitation ion cluster for kepone exceeded QC limits. The reviewer calculated the result for kepone in this sample using the confirmation ion cluster (the ion abundance ratio was within QC limits for the confirmation ion cluster) to be 5.92 μg/Kg. Taking the worst-case scenario, the reviewer has opted to report the higher of the two values.

- The actual detection limit for toluene in sample 27-1-7-91-SW1 may be higher than reported and has been flagged "UL" on the data tables. A slightly low recovery was obtained for toluene in the associated matrix spike duplicate sample.

- The reported result for N-nitrosodiphenylamine in sample 64-SB2-A should be used with caution. Although not detected in any of the blanks associated with this sample, this compound has been known to be a historical contaminant at this laboratory. In addition, the result for N-nitrosodiphenylamine actually represents the total of diphenylamine and N-nitrosodiphenylamine. The analysis performed on this sample is not capable of distinguishing between the two compounds.

- The laboratory reported results for the compound in the following samples with the following qualifiers. The reviewer agrees with the laboratory's qualifications.

Sample	Compound	Qualification
32-1-7-91-SW4	mirex	x,y,z
34-1-7-91-SW5	mirex	x,y
50-1-9-91-SB8-B	mirex	E
51-1-9-91-SB8-C	kepone	F,x,z
53-1-10-91-SB5-A	kepone	x,z

Sample	Compound	Qualification
57-SB3-A	mirex	y
58-SB3-B	mirex	x,y
59-SB3-C	kepone	x,z
60-SB6-A	kepone	y,z
62-FB	mirex	x,y,z
65-SB2-B	mirex	y

NOTES:

z Presence of the compound is strongly indicated, but the ion abundance ratio criteria are not met for the quantitation cluster ions.

x Presence of the compound is strongly indicated, but the ion abundance ratio criteria are not met for the confirmation cluster ions.

y Presence of the compound is strongly indicated, but not all specified ions in the clusters are present.

k Quantitation done using confirmation cluster ions.

F Reported value estimated due to an interference.

E Exceeded the calibration range.

- Tentatively Identified Compounds (TICs) for the VOA and BNA analyses performed have been evaluated and are presented on the data tables. The majority of the TICs appear to be unknowns, alkylbenzenes, alkanes and laboratory artifacts.

- Per CLP protocols, all results reported below the quantitation limits should be considered estimated and have been flagged "J" on the data tables.

A complete support documentation of this quality assurance review is presented in Section 3 of this report.

B. Conclusions

This quality assurance review has identified aspects of the analytical data that have required qualification. The majority of the data appear to be acceptable for use. However, the volatile analyses of a few samples are unreliable or biased low due to poor surrogate recoveries. In addition, a few results should be considered estimated due to various QC results. To confidently use any of the analytical results from the data sets examined, the data users should understand the qualifications and limitations stated in this report.

Report prepared by:

Ruth L. Forman
Senior Quality Assurance Chemist

ENVIRONMENTAL STANDARDS, INC.
1220 Valley Forge Road
P.O. Box 911
Valley Forge, PA 19481
(215) 935-5577

Report reviewed and approved by:

Rock J. Vitale
Quality Assurance Specialist/
Principal

Date: 3/19/91

SECTION 2

ANALYTICAL RESULTS

VOLATILE ORGANIC ANALYSES ANALYTICAL RESULTS

SMC Environmental Services Sample Number			26 1 / 91 MS	27 1 / 91 SW1	30 1 7 91 SW2	31 1 7 91 SW6	32-1-7 91 SW4	33-1 SW3	34 1-7-91-SW5	36-1 / 91-18	28-1-7-91-MS-SW1	29 1-7 91-MSD SW1
Laboratory File Number			7980 07	7980-01	7980-02	7980-06	7980-04	7980 03	7980-05	7980 08	7980-01MS	7980-01MSD
Remarks			Field Blank							Trip Blank		
Units			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOLATILE COMPOUNDS	Quantitation limit (Aq)	Quantitation limit (Sol)										
Chloromethane	10	10										
Bromomethane	10	10										
Vinyl Chloride	10	10					31 J					
Chloroethane	10	10										
Methylene Chloride	5	5		1 B						1 J		
Acetone	10	10							1700			
Carbon Disulfide	5	5	24		4 B	10 B		23 B	100 B	1 J		
1,1-Dichloroethene	5	5									5	5
1,1-Dichloroethane	5	5										
1,2-Dichloroethene (total)	5	5					160					
Chloroform	5	5										
1,2-Dichloroethane	5	5										
2-Butanone	10	10										
1,1,1-Trichloroethane	5	5										
Carbon Tetrachloride	5	5										
Vinyl Acetate	10	10										
Bromodichloromethane	5	5										
1,1,2,2-Tetrachloroethane	5	5			3 J		480		49 J			
1,2-Dichloropropane	5	5										
trans-1,3-Dichloropropene	5	5										
Trichloroethene	5	5					160				5	5
Dibromochloromethane		5										
1,1,2-Trichloroethane	5	5										
Benzene	5	5					9 J				5	5

ORIGINAL (Red)

AR302572

VOLATILE ORGANIC ANALYSES - ANALYTICAL RESULTS

SHC Environmental Services Sample Number			26-1-7-91-FB	27-1-7-91-SB	30-1-7-91-SB2	31-1-7-91-SB5	32-1-7-91-SB4	33-1-7-91-SB3	34-1-7-91-SB5	35-1-7-91-TB	28-1-7-91-MS-SB	29-1-7-91-MSD-SB
Laboratory File Number			7500-07	7500-08	7500-02	7500-05	7500-04	7500-03	7500-06	7500-09	7500-06MS	7500-06MSD
Remarks			Field Blank							Trip Blank		
Units			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOLATILE COMPOUNDS	Quantitation Limit (Aq)	Quantitation Limit (Sol)										
Chloromethane	10	10										
Bromomethane	10	10										
Vinyl Chloride	10	10					38 J					
Chloroethane	10	10										
Methylene Chloride	5	5		1 B						1 J		
Acetone	10	10							1700			
Carbon Disulfide	5	5	24		4 B	30 B		25 B	880 B	1 J		
1,1-Dichloroethene	5	5									5	5
1,1-Dichloroethane	5	5										
1,2-Dichloroethene (total)	5	5					160					
Chloroform	5	5										
1,2-Dichloroethane	5	5										
2-Butanone	10	10										
1,1,1-Trichloroethane	5	5										
Carbon Tetrachloride	5	5										
Vinyl Acetate	10	10										
Bromodichloromethane	5	5										
1,1,2,2-Tetrachloroethane	5	5			3 J		460		69 J			
1,2-Dichloropropane	5	5										
trans-1,3-Dichloropropene	5	5										
Trichloroethene	5	5					180				5	5
Dibromochloromethane	5	5										
1,1,2-Trichloroethane	5	5										
Benzene	5	5					9 J				5	5

VOLATILE ORGANIC ANA[illegible] ANALYTICAL RESULTS

SMC Environmental S[illegible] Sample Number / Laboratory File Number			26-1-7-91-FB / 7900-07	27-1-7-91-S01 / 7900-01	30-1-7-91-S02 / 7900-02	31-1-7-91-S06 / 7900-06	32-1-7-91-S04 / 7900-04	33-1-7-91-S03 / 7900-03	34-1-7-91-S05 / 7900-05	35-1-7-91-TB / 7900-08	[illegible]1-05-S01 / 7900-01MS	29-1-7-91-0S0-S01 / 7900-01MSD
Remarks			Field Blank							Trip Blank		
Units			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOLATILE COMPOUNDS	Quantitation Limit (Aq)	Quantitation Limit (Sol)										
cis-1,3-Dichloropropene	5	5										
Bromoform	5	5										
2-Hexanone	10	10										
4-Methyl-2-Pentanone	10	10										
Tetrachloroethene	5	5					26					
Toluene	5	5		UL	1 J		210		230		$	$
Chlorobenzene	5	5					10 J		2500		$	$
Ethylbenzene	5	5					60					
Styrene	5	5										
Xylene (total)	5	5					200		64 J			
Quantitation Limit Multiplier			1.00	1.00	1.00	1.00	5.00	1.00	20.0	1.00	1.00	1.00
Date of Sample Collection			01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91
Date Sample Received by Laboratory			01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91
Date of Sample Analysis			01/11/91	01/11/91	01/11/91	01/11/91	01/11/91	01/11/91	01/11/91	01/11/91	01/11/91	01/11/91
Instrument Used for Analysis			05-V3	05-V3	05-V3	05-V3	05-V3	05-V3	05-V3	05-V3	05-V3	05-V3

NOTES:
- \- Compound was not detected.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- R Unreliable result - Compound may or may not be present in this sample.
- UL This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.
- B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
- $ Matrix spike compound.

TENTATIVELY IDENTIFIED COMPOUNDS - ESTIMATED CONCENTRATIONS

SAIC Environmental Services Sample Number	26-1-7-91-FB	27-1-7-91-SB1	28-1-7-91-SB2	31-1-7-91-SB5	32-1-7-91-SB6	33-1-7-91-SB3	34-1-7-91-SB4	35-1-7-91-RB	29-1-7-91-MS-SB8	29-1-7-91-MSD-SB8
Laboratory File Number	7900-07	7900-01	7900-02	7900-05	7900-06	7900-03	7900-04	7900-08	7900-0805	7900-0805D
Remarks	Field Blank							Trip Blank		
Units	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
COMPOUNDS										
VOLATILE COMPOUNDS	-	-	-	-	-	-	-	-	NA	NA

NOTES: - Compound was not detected.
J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
B Unreliable result - Compound may or may not be present in this sample.
UL This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.
B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
S Matrix spike compound.
NA Not analyzed.

EXTRACTABLE ORGANIC ANALYSES ANALYTICAL RESULTS

SMC Environmental Services Sample Number		26-1-7-91-FB	27-1-7-91-SW1	30-1-7-91-SW2	31-1-7-91-SW6	32-1-7-91-SW4	33-1-7-91-SW3	34-1-7-91-SW5	36-1-7-91-TB	28-1-7-91-MS-SW1	29-1-7-91-MSD-SW1
Laboratory File Number		7988-07	7988-01	7988-02	7988-06	7988-04	7988-03	7988-05	7988-08	7988-01MS	7988-01MSD
Remarks		Field Blank							Trip Blank		
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOLATILE COMPOUNDS	Reporting Limit										
Kepone	0.132					0.939			NA	S	S
Mirex	0.00544					0.00820 J		0.0452	NA	S	S
Quantitation Limit Multiplier		1.00	1.00	1.00	1.00	1.00	1.00	1.00	NA	1.00	1.00
Date of Sample Collection		01/07/91	01/07/91	01/07/91	01/07/91	01/07/91	01/07/91	01/07/91	NA	01/07/91	01/07/91
Date Sample Received by Laboratory		01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	NA	01/09/91	01/09/91
Date Sample Extracted		01/11/91	01/11/91	01/11/91	01/11/91	01/11/91	01/11/91	01/11/91	NA	01/11 & 01/24	01/11 & 01/24
Date of Sample Analysis		01/23/91	01/23/91	01/23/91	01/23/91	01/23/91	01/23/91	01/23/91	NA	01/25/91	01/25/91
Instrument Used for Analysis		MS-S3	MS-S3	MS-S3	MS-S3	MS-S3	MS-S3	MS-S3	NA	MS-S3	MS-S3

ORIGINAL (Red)

NOTES: - Compound was not detected.
J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
R Unreliable result - Compound may or may not be present in this sample.
UL This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.
B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
S Matrix spike compound.

VOLATILE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS -page 5

ORIGINAL (Red)

SMC Environmental Services Sample Number			49-1-9-91-SB8-A	50-1-9-91-SB8-B	51-1-9-91-SB8-C	48-1-9-91-SB8-FB	52-1-9-91-TB
Laboratory Sample Number			7983-01	7983-02	7983-03	7983-04	7983-05
Remarks						Field Blank	Trip Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
VOLATILE COMPOUNDS	Quantitation Limit (Aq)	Quantitation Limit (Sol)					
Chloromethane	10	10	UL	UL	UL		
Bromomethane	10	10	UL	UL	UL		
Vinyl Chloride	10	10	UL	UL	UL		
Chloroethane	10	10	UL	UL	UL		
Methylene Chloride	5	5	130 B	UL	UL	2 J	3 J
Acetone	10	10	11,000 J	18,000 J	22,000 J		
Carbon Disulfide	5	5	UL	UL	UL		5
1,1-Dichloroethene	5	5	UL	UL	UL		
1,1-Dichloroethane	5	5	UL	UL	UL		
Total 1,2-Dichloroethene	5	5	170 J	UL	UL		
Chloroform	5	5	UL	UL	UL		
1,2-Dichloroethane	5	5	UL	UL	UL		
2-Butanone	10	10	UL	UL	UL		
1,1,1-Trichloroethane	5	5	UL	UL	UL		
Carbon Tetrachloride	5	5	UL	UL	UL		
Vinyl Acetate	10	10	UL	UL	UL		
Bromodichloromethane	5	5	UL	UL	UL		
1,1,2,2-Tetrachloroethane	5	5	350 J	35,000 J	19,000 J		
1,2-Dichloropropane	5	5	UL	UL	UL		
trans-1,3-Dichloropropene	5	5	UL	UL	UL		
Trichloroethene	5	5	440 J	2800 J	420 J		
Dibromochloromethane	5	5	UL	UL	UL		
1,1,2-Trichloroethane	5	5	UL	UL	UL		
Benzene	5	5	UL	UL	UL		

AR302577

VOLATILE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS -page 6

SMC Environmental Services Sample Number			49-1-9-91-SB8-A	50-1-9-91-SB8-B	51-1-9-91-SB8-C	48-1-9-91-SB8-FB	52-1-9-91-TB
Laboratory Sample Number			7983-01	7983-02	7983-03	7983-04	7983-05
Remarks						Field Blank	Trip Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
VOLATILE COMPOUNDS	Quantitation limit (Aq)	Quantitation limit (Sol)					
cis-1,3-Dichloropropene	5	5	UL	UL	UL		
Bromoform	5	5	UL	UL	UL		
2-Hexanone	10	10	UL	UL	UL		
4-Methyl-2-Pentanone	10	10	UL	UL	UL		
Tetrachloroethene	5	5	UL	2100 J	UL		
Toluene	5	5	UL	890 J	190 J		
Chlorobenzene	5	5	UL	UL	UL		
Ethylbenzene	5	5	UL	1800 J	270 J		
Styrene	5	5	UL	UL	UL		
Total Xylenes	5	5	450 J	16,000 J	3000 J		
Quantitation Limit Multiplier			62.0	330	150	1.00	1.00
Date of Sample Collection			1/9/91	1/9/91	1/9/91	1/9/91	1/9/91
Date Sample Received by Laboratory			1/10/91	1/10/91	1/10/91	1/10/91	1/10/91
Date of Sample Analysis			1/15/91	1/13/91	1/13/91	1/11/91	1/11/91
Instrument Used for Analysis			MS-V3	MS-V3	MS-V3	MS-V3	MS-V3

NOTES: - Compound was not detected.
B This result is qualitatively suspect since this compound was detected in field and/or laboratory blank at similar levels.
R Unreliable result - Compound may or may not be present in this sample.
J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
UL This compound was not detected, but the quantiation limit is probably higher due to low bias identified during the quality assurance review.
S Matrix spike compound.
NA Not analyzed.

AR302578

TENTATIVELY IDENTIFIED COMPOUNDS - ESTIMATED CONCENTRATIONS

SMC Environmental Services Sample Number	49-1-9-91-SB8-A	50-1-9-91-SB8-B	51-1-9-91-SB8-C	48-1-9-91-SB8-FB	52-1-9-91-TB
Laboratory Sample Number	7983-01	7983-02	7983-03	7983-04	7983-05
Remarks				Field Blank	Trip Blank
Units	ug/Kg	ug/Kg	ug/Kg	ug/l	ug/l
VOLATILE COMPOUNDS	-	-	-	-	-

ORIGINAL (Red)

NOTES: - Compound was not detected.

B This result is qualitatively suspect since this compound was detected in field and/or laboratory blank at similar levels.

R Unreliable result - Compound may or may not be present in this sample.

J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).

UL This compound was not detected, but the quantiation limit is probably higher due to low bias identified during the quality assurance review.

S Matrix spike compound.

NA Not detected.

EXTRACTABLE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS

SMC Environmental Services Sample Number			49-1-9-91-SB8-A	50-1-9-91-SB8-B	51-1-9-91-SB8-C	48-1-9-91-SB8-FB	52-1-9-91-TB
Laboratory Sample Number			7983-01	7983-02	7983-03	7983-04	7983-05
Remarks						Field Blank	Trip Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
VOLATILE COMPOUNDS	Reporting Limit (Aq)	Reporting Limit (Sol)					
Kepone	0.132	68.0		3260 J*	5.52 J		NA
Mirex	0.00544	18.5	62.6	42,300 J*	34.1		NA
Quantitation Limit Multiplier			1.10	256	1.14	1.00	NA
Date of Sample Collection			1/9/91	1/9/91	1/9/91	1/9/91	NA
Date Sample Received by Laboratory			1/10/91	1/10/91	1/10/91	1/10/91	NA
Date Sample Extracted			1/10/91	1/10/91	1/10/91	1/11/91	NA
Date of Sample Analysis			1/19/91	1/23/91	1/19/91	1/23/91	NA
Instrument Used for Analysis			MS-S3	MS-S3	MS-S3	MS-S3	NA

ORIGINAL (Red)

NOTES: - Compound was not detected.
B This result is qualitatively suspect since this compound was detected in field and/or laboratory blank at similar levels.
R Unreliable result - Compound may or may not be present in this sample.
J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
UL This compound was not detected, but the quantiation limit is probably higher due to low bias identified during the quality assurance review.
S Matrix spike compound.
NA Not analyzed.
* Result is reported from a secondary dilution analysis.

VOLATILE ORGANIC ANALYSES - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS

ORIGINAL (Red)

SMC Environmental Services Sample Number / Laboratory File Number			53-1-10-91-SB5-A 7994-01	54-1-10-91-SB5-B 7994-02	55-1-10-91-FB 7994-03	56-1-10-91-TB 7994-04
Remarks					Field Blank	Trip Blank
Units			ug/Kg	ug/Kg	ug/L	ug/L
VOLATILE COMPOUNDS	Quantitation Limit (Aq)	Quantitation Limit (Sol)				
Chloromethane	10	10				
Bromomethane	10	10				
Vinyl Chloride	10	10		17		
Chloroethane	10	10				
Methylene Chloride	5.0	5.0	11 B	2 B		
Acetone	10	10	30 J	54 J		
Carbon Disulfide	5.0	5.0	32	7		
1,1-Dichloroethene	5.0	5.0				
1,1-Dichloroethane	5.0	5.0				
1,2-Dichloroethene (total)	5.0	5.0		37		
Chloroform	5.0	5.0		3 J		
1,2-Dichloroethane	5.0	5.0				
2-Butanone	10	10	24 B	7 B		
1,1,1-Trichloroethane	5.0	5.0				
Carbon Tetrachloride	5.0	5.0				
Vinyl Acetate	10	10				
Bromodichloromethane	5.0	5.0				
1,1,2,2-Tetrachloroethane	5.0	5.0				
1,2-Dichloropropane	5.0	5.0				
trans-1,3-Dichloropropene	5.0	5.0				
Trichloroethene	5.0	5.0		68		
Dibromochloromethane	5.0	5.0				
1,1,2-Trichloroethane	5.0	5.0				
Benzene	5.0	5.0	15 J	21		

VOLATILE ORGANIC ANALYSES - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS -page 10

SMC Environmental Services Sample Number			S3-1-10-91-SB5-A	S4-1-10-91-SB5-B	S5-1-10-91-FB	S6-1-10-91-TB
Laboratory File Number			7994-01	7994-02	7994-03	7994-04
Remarks						
Units			ug/Kg	ug/Kg	ug/L	ug/L
VOLATILE COMPOUNDS	Quantitation limit (Aq)	Quantitation limit (Sol)				
cis-1,3-Dichloropropene	5.0	5.0				
Bromoform	5.0	5.0				
2-Hexanone	10	10				
4-Methyl-2-Pentanone	10	10				
Tetrachloroethene	5.0	5.0		14		
Toluene	5.0	5.0	6 J	10		
Chlorobenzene	5.0	5.0		4 B	2 J	
Ethylbenzene	5.0	5.0		69		
Styrene	5.0	5.0				
Xylene (total)	5.0	5.0		9		
Quantitation Limit Multiplier			5.8	1.3	1.00	1.00
Date of Sample Collection			01/10/91	01/10/91	01/10/91	01/10/91
Date Sample Received by Laboratory			01/11/91	01/11/91	01/11/91	01/11/91
Date of Sample Analysis			01/15/91	01/15/91	01/14/91	01/14/91
Instrument Used for Analysis			MS-V2	MS-V2	MS-V3	MS-V3

ORIGINAL (Red)

NOTES:
- \- Compound was not detected.
- B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
- R Unreliable result - Compound may or may not present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UL This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

AR302582

TENTATIVELY IDENTIFIED COMPOUNDS - ESTIMATED CONCENTRATIONS

SMC Environmental Services Sample Number	53-1-10-91-SBS-A	54-1-10-91-SBS-B	55-1-10-91 FB	56-1-10-91-FB
Laboratory File Number	7994-01	7994-02	7994-03	7994-04
Remarks				
Units	ug/Kg	ug/Kg	ug/L	ug/L
COMPOUNDS				
VOLATILE COMPONENTS		-	-	-
Furan, tetrahydro-	810 J			

ORIGINAL (Red)

NOTES:
- \- Compound was not detected.
- B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
- R Unreliable result - Compound may or may not present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UL This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

EXTRACTABLE ORGANIC ANALYSES- ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS -page 12

SMC Environmental Services Sample Number			S3-1-10-91-SB5-A	S4-1-10-91-SB5-B	S5-1-10-91-FB	S6-1-10-91-TB
Laboratory File Number			7994-01	7994-02	7994-03	7994-04
Remarks					Field Blank	Trip Blank
Units			ug/Kg	ug/Kg	ug/L	ug/L
COMPOUNDS	Reporting limit (Aq)	Reporting limit (Sol)				
Kepone	0.0132	68.0	5.91 J	6.35 J		NA
Mirex	0.00544	18.5		3.05 J		NA
Quantitation Limit Multiplier			1.26	1.33	1.00	NA
Date of Sample Collection			01/10/91	01/10/91	01/10/91	NA
Date Sample Received by Laboratory			01/11/91	01/11/91	01/11/91	NA
Date Sample Extracted			01/14/91	01/14/91	01/14/91	NA
Date of Sample Analysis			01/19/91	01/19/91	01/19/91	NA
Instrument Used for Analysis			MS-S3	MS-S3	MS-S3	NA

ORIGINAL (Red)

NOTES:
- Compound was not detected.
B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
R Unreliable result - Compound may or may not present in this sample.
J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
Ut This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.
NA Not analyzed.

AR302584

VOLATILE ORGANIC ANALYSES - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS

ORIGINAL (Red)

SMC Environmental Services Sample Number			S7-SB3-A	S7 SB3-ADL	S8-SB3-B	S8 SB3-BDL	S9-SB3-C	S9-SB3-CDL1	S9-SB3-CDL2	S0-SB6-A	S1 SB6 B	S3-TB	S2-FB
Laboratory File Number			8016-01	8016-01DL	8016-02	8016-02DL	8016-03	8016-03DL1	8016-03DL2	8016-04	8016-05	8016-07	8016-06
Remarks				Dilution		Dilution		Dilution	Dilution			Trip Blank	Field Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
VOLATILE COMPOUNDS	Quantitation Limit (Aq)	Quantitation Limit (Sol)											
Chloromethane	10	10	UL	R	UL	R	UL	R		UL			NA
Bromomethane	10	10	UL	R	UL	R	UL	R		UL			NA
Vinyl Chloride	10	10	UL	R	UL	R	UL	R		UL			NA
Chloroethane	10	10	UL	R	UL	R	UL	R		UL			NA
Methylene Chloride	5.0	5.0	550 B	2600 B	750 B	5900 B	840 B	13,000 B	-	640 B	11 B	5 J	NA
Acetone	10	10	1600 J	930 J	2000 J	R	2300 J	R		UL	18		NA
Carbon Disulfide	5.0	5.0	UL	R	UL	R	UL	R		UL			NA
1,1-Dichloroethene	5.0	5.0	UL	R	UL	R	UL	R		UL			NA
1,1-Dichloroethane	5.0	5.0	UL	R	UL	R	UL	R		UL			NA
1,2-Dichloroethene (total)	5.0	5.0	380 J	280 J	880 J	590 J	3400 J	1900 J			5 J		NA
Chloroform	5.0	5.0	UL	R	UL	R	UL	R		UL	19		NA
1,2-Dichloroethane	5.0	5.0	UL	R	UL	R	UL	R		UL			NA
2-Butanone	10	10	290 B	280 B	630 B	1600 B	230 B	2900 B		250 B	9 J		NA
1,1,1-Trichloroethane	5.0	5.0	UL	R	UL	R	UL	R		UL			NA
Carbon Tetrachloride	5.0	5.0	UL	R	UL	R	UL	R		UL			NA
Vinyl Acetate	10	10	UL	R	UL	R	UL	R		UL			NA
Bromodichloromethane	5.0	5.0	UL	R	UL	R	UL	R		UL			NA
1,1,2,2-Tetrachloroethane	5.0	5.0	740 J	510 J	170 J	R	17,000 J	12,000 J		UL			NA
1,2-Dichloropropane	5.0	5.0	UL	R	UL	R	UL	R		UL			NA
trans-1,3-Dichloropropene	5.0	5.0	UL	R	UL	R	UL	R		UL			NA
Trichloroethene	5.0	5.0	440 J	340 J	1300 J	1000 J	19,000 J	16,000 J	22,000 J	250 J	86		NA
Dibromochloromethane	5.0	5.0	UL	R	UL	R	UL	R		UL			NA
1,1,2-Trichloroethane	5.0	5.0	UL	R	UL	R	280 J	R		UL			NA
Benzene	5.0	5.0	UL	R	130 J	R	1200 J	920 J		UL			NA

VOLATILE ORGANIC ANALYSES - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS

ORIGINAL (Red)

SMC Environmental Services Sample Number			57-SB3-A	57-SB3-ADL	58-SB3-B	58-SB3-BDL	59-SB3-C	59-SB3-CDL1	59-SB3-CDL2	60-SB6-A	61-SB6-B	63-TB	62-FB
Laboratory File Number			8016-01	8016-01DL	8016-02	8016-02DL	8016-03	8016-03DL1	8016-03DL2	8016-04	8016-05	8016-07	8016-06
Remarks				Dilution		Dilution		Dilution	Dilution			Trip Blank	Field Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
VOLATILE COMPOUNDS	Quantitation Limit (Aq)	Quantitation Limit (Sol)											
cis-1,3-Dichloropropene	5.0	5.0	UL	R	UL	R	UL	R		UL			NA
Bromoform	5.0	5.0	UL	R	UL	R	UL	R		UL			NA
2-Hexanone	10	10	UL	R	UL	R	UL	R		UL			NA
4-Methyl-2-Pentanone	10	10	UL	R	UL	R	UL	R		UL			NA
Tetrachloroethene	5.0	5.0	UL	R	UL	R	6400 J	6100 J		140 J	17		NA
Toluene	5.0	5.0	16,000 J	12,000 J	33,000 B	28,000 B	100,000 J	370,000 J	760,000	1100 J	17		NA
Chlorobenzene	5.0	5.0	UL	R	UL	R	1000 J	890 J		UL			NA
Ethylbenzene	5.0	5.0	2000 J	1500 J	5600 B	5200 B	77,000 J	160,000 J	270,000	1400 B	6		NA
Styrene	5.0	5.0	UL	R	140 J	R	UL	R		UL			NA
Xylene (total)	5.0	5.0	9500 J	7500 J	26,000 J	23,000 J	170,000 J	580,000 J	1,300,000	7200 B	34		NA
Quantitation Limit Multiplier			7.30	150	98.0	360	77.0	770	7700	54.0	1.20	1.00	NA
Date of Sample Collection			01/15/91	01/15/91	01/15/91	01/15/91	01/15/91	01/15/91	01/15/91	01/15/91	01/15/91	01/15/91	NA
Date Sample Received by Laboratory			01/16/91	01/16/91	01/16/91	01/16/91	01/16/91	01/16/91	01/16/91	01/16/91	01/16/91	01/16/91	NA
Date of Sample Analysis			01/23/91	01/23/91	01/23/91	01/23/91	01/23/91	01/23/91	01/26/91	01/23/91	01/22/91	01/21/91	NA
Instrument Used for Analysis			MS-V2	MS-V2	MS-V2	MS-V2	MS-V2	MS-V2	MS-V2	MS-V2	MS-V2	MS-V3	NA

NOTES: - Compound was not detected.
J Quantitation is approximate due to limitations identified during the quality control review (data validation).
R Unreliable result - Compound may or may not be present in this sample.
UL This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.
B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
NA Not analyzed.

TENTATIVELY IDENTIFIED COMPOUNDS - ESTIMATED CONCENTRATIONS

SMC Environmental Services Sample Number	57-SB3-A	57-SB3-ADL	58-SB3-B	58-SB3-BDL	59-SB3-C	59-SB3-CDL1	59-SB3-CDL2	60-SB6-A	61-SB6-B	63-TB	62-FB
Laboratory File Number	8816-01	8816-01DL	8816-02	8816-02DL	8816-03	8816-03DL1	8816-03DL2	8816-04	8816-05	8816-07	8816-06
Remarks		Dilution		Dilution		Dilution	Dilution			Trip Blank	Field Blank
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
COMPOUNDS											
VOLATILE COMPOUNDS	-	-	-	-			-	-		-	NA
Laboratory Artifact									16 R		
Ethylmethylbenzene					18,000 J	16,000 J					

ORIGINAL (Red)

NOTES: - Compound was not detected.
J Quantitation is approximate due to limitations identified during the quality control review (data validation).
R Unreliable result - Compound may or may not be present in this sample.
UL This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.
B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
NA Not analyzed.

EXTRACTABLE ORGANIC ANALYSES- ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS

SMC Environmental Services Sample Number			57-SB3-A	57-SB3-ADL	58-SB3-B	58-SB3-BDL	59-SB3-C	59-SB3-CDL1	59-SB3-CDL2	60-SB6-A	61-SB6-B	63-TB	62-FB
Laboratory File Number			8016-01	8016-01DL	8016-02	8016-02DL	8016-03	8016-03DL1	8016-03DL2	8016-04	8016-05	8016-07	8016-06
Remarks				Dilution		Dilution		Dilution	Dilution			Trip Blank	Field Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
COMPOUNDS	Reporting Limit (Aq)	Reporting Limit (Sol)											
Kepone	0.132	68.0		NA		NA	35.4 J	NA	NA	5.92 J		NA	
Mirex	0.00544	18.5	3.51 J	NA	1.21 J	NA	52.3	NA	NA	38.2	9.81 J	NA	0.00400 J
Quantitation Limit Multiplier			1.37	NA	1.82	NA	1.45	NA	NA	1.10	1.18	NA	1.00
Date of Sample Collection			01/15/91	NA	01/15/91	NA	01/15/91	NA	NA	01/15/91	01/15/91	NA	01/15/91
Date Sample Received by Laboratory			01/16/91	NA	01/16/91	NA	01/16/91	NA	NA	01/16/91	01/16/91	NA	01/16/91
Date Sample Extracted			01/17/91	NA	01/17/91	NA	01/17/91	NA	NA	01/17/91	01/17/91	NA	01/17/91
Date of Sample Analysis			01/24/91	NA	01/25/91	NA	01/24/91	NA	NA	01/25/91	01/25/91	NA	01/24/91
Instrument Used for Analysis			HS-S3	NA	HS-S3	NA	HS-S3	NA	NA	HS-S3	HS-S3	NA	HS-S3

ORIGINAL (Red)

NOTES: - Compound was not detected.
J Quantitation is approximate due to limitations identified during the quality control review (data validation).
R Unreliable result - Compound may or may not be present in this sample.
UL This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.
B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
NA Not analyzed.

VOLATILE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS -page 17

SMC Environmental Services Sample Number			64-SB2-A	65-SB2-B	66-SB2-C	67-FB	68-TB
Laboratory Sample Number			8037-01	8037-02	8037-03	8037-04	8037-05
Remarks						Field Blank	Trip Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/l	ug/l
VOLATILE COMPOUNDS	Quantitation Limit (Aq)	Quantitation Limit (Sol)		Analyzed Twice			
Chloromethane	10	10	R	R/		R	R
Bromomethane	10	10	R	R/		R	R
Vinyl Chloride	10	10	R	R/		R	R
Chloroethane	10	10	R	R/		R	R
Methylene Chloride	5	5	1400 B	1800 B/390 B	830 B	3 J	8 J
Acetone	10	10	R	R/		R	R
Carbon Disulfide	5	5	R	R/		R	R
1,1-Dichloroethene	5	5	R	R/		R	R
1,1-Dichloroethane	5	5	R	R/		R	R
Total 1,2-Dichloroethene	5	5	930 J	270 J/-		R	R
Chloroform	5	5	R	R/		R	R
1,2-Dichloroethane	5	5	R	R/		R	R
2-Butanone	10	10	1200 B	650 B/-	300 B	R	R
1,1,1-Trichloroethane	5	5	R	R/		R	R
Carbon Tetrachloride	5	5	R	R/		R	R
Vinyl Acetate	10	10	R	R/		R	R
Bromodichloromethane	5	5	R	R/		R	R
1,1,2,2-Tetrachloroethane	5	5	240 J	R/	1300	R	R
1,2-Dichloropropane	5	5	2000 J	540 J/-		R	R
trans-1,3-Dichloropropene	5	5	R	R/		R	R
Trichloroethene	5	5	1300 J	430 J/-	210 J	R	R
Dibromochloromethane	5	5	R	R/		R	R
1,1,2-Trichloroethane	5	5	R	R/		R	R
Benzene	5	5	R	R/		R	R

(ORIGINAL (Red))

AR302589

VOLATILE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS -page 18

SMC Environmental Services Sample Number			64-SB2-A	65-SB2-B	66-SB2-C	67-FB	68-TB
Laboratory Sample Number			8837-01	8837-02	8837-03	8837-04	8837-05
Remarks (ORIGINAL (Red))						Field Blank	Trip Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
VOLATILE COMPOUNDS	Quantitation Limit (Aq)	Quantitation Limit (Sol)		Analyzed Twice			
cis-1,3-Dichloropropene	5	5	R	R/		R	R
Bromoform	5	5	R	R/		R	R
2-Hexanone	10	10	R	R/		R	R
4-Methyl-2-Pentanone	10	10	R	R/		R	R
Tetrachloroethene	5	5	2700 J	650 J/-		R	R
Toluene	5	5	1900 J	1600 J/-	310 J	R	R
Chlorobenzene	5	5	23,000 J	65,000 J/71,000 J	290 J	R	R
Ethylbenzene	5	5	4900 J	3200 J/-	600	R	R
Styrene	5	5	R	R/		R	R
Total Xylenes	5	5	840 J	610 J/-	110 J	R	R
Quantitation Limit Multiplier			240	240/600	67.0	1.00	1.00
Date of Sample Collection			1/16/91	1/16/91	1/16/91	1/16/91	1/16/91
Date Sample Received by Laboratory			1/17/91	1/17/91	1/17/91	1/17/91	1/17/91
Date of Sample Analysis			1/23/91	1/23 & 1/25	1/23/91	1/21/91	1/21/91
Instrument Used for Analysis			MS-V2	MS-V2 & MS-V3	MS-V2	MS-V3	MS-V3

NOTES:
- \- Compound was not detected.
- B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
- R Unreliable result - Compound may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validaiton).
- UJ This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

EXTRACTABLE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS

SMC Environmental Services Sample Number			64-SB2-A	65-SB2-B	66-SB2-C	67-FB	68-TB
Laboratory Sample Number			8837-01	8837-02	8837-03	8837-04	8837-05
Remarks						Field Blank	Trip Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
SEMIVOLATILE COMPOUNDS	Quantitation Limit (Aq)	Quantitation Limit (Sol)					
Phenol	10	330		NA	NA		NA
bis(2-Chloroethyl)ether	10	330		NA	NA		NA
2-Chlorophenol	10	330		NA	NA		NA
1,3-Dichlorobenzene	10	330		NA	NA		NA
1,4-Dichlorobenzene	10	330		NA	NA		NA
Benzyl Alcohol	10	330		NA	NA		NA
1,2-Dichlorobenzene	10	330		NA	NA		NA
2-Methylphenol	10	330		NA	NA		NA
bis(2-Chloroisopropyl)ether	10	330		NA	NA		NA
4-Methylphenol	10	330		NA	NA		NA
N-Nitroso-di-n-Propylamine	10	330		NA	NA		NA
Hexachloroethane	10	330		NA	NA		NA
Nitrobenzene	10	330		NA	NA		NA
Isophorone	10	330		NA	NA		NA
2-Nitrophenol	10	330		NA	NA		NA
2,4-Dimethylphenol	10	330		NA	NA		NA
Benzoic Acid	50	1650		NA	NA		NA
bis(2-Chloroethoxy)methane	10	330		NA	NA		NA
2,4-Dichlorophenol	10	330		NA	NA		NA
1,2,4-Trichlorobenzene	10	330		NA	NA		NA
Naphthalene	10	330		NA	NA		NA
4-Chloroaniline	10	330		NA	NA		NA
Hexachlorobutadiene	10	330		NA	NA		NA
4-Chloro 3-Methylphenol	10	330		NA	NA		NA
2-Methylnaphthalene	10	330		NA	NA		NA

ORIGINAL (Red)

EXTRACTABLE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS -page 20

ORIGINAL (Red)

SMC Environmental Services Sample Number			64-SB2-A	65-SB2-B	66-SB2-C	67-FB	68-TB
Laboratory Sample Number			8037-01	8037-02	8037-03	8037-04	8037-05
Remarks						Field Blank	Trip Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/l	ug/l
SEMIVOLATILE COMPOUNDS	Quantitation Limit (Aq)	Quantitation Limit (Sol)					
Hexachlorocyclopentadiene	10	330		NA	NA		NA
2,4,6-Trichlorophenol	10	330		NA	NA		NA
2,4,5-Trichlorophenol	50	1650		NA	NA		NA
2-Chloronaphthalene	10	330		NA	NA		NA
2-Nitroaniline	50	1650		NA	NA		NA
Dimethylphthalate	10	330		NA	NA		NA
Acenaphthylene	10	330		NA	NA		NA
3-Nitroaniline	50	1650		NA	NA		NA
Acenaphthene	10	330		NA	NA		NA
2,4-Dinitrophenol	50	1650		NA	NA		NA
4-Nitrophenol	50	1650		NA	NA		NA
Dibenzofuran	10	330		NA	NA		NA
2,4-Dinitrotoluene	10	330		NA	NA		NA
2,6-Dinitrotoluene	10	330		NA	NA		NA
Diethylphthalate	10	330		NA	NA		NA
4-Chlorophenylphenylether	10	330		NA	NA		NA
Fluorene	10	330		NA	NA		NA
4-Nitroaniline	50	1650		NA	NA	R	NA
4,6-Dinitro-2-Methylphenol	50	1650		NA	NA		NA
N-Nitrosodiphenylamine	10	330	160 J	NA	NA		NA
4-Bromophenylphenylether	10	330		NA	NA		NA
Hexachlorobenzene	10	330		NA	NA		NA
Pentachlorophenol	50	1650		NA	NA		NA
Phenanthrene	10	330		NA	NA		NA

EXTRACTABLE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS

ORIGINAL (Red)

SMC Environmental Services Sample Number			64-SB2-A	65-SB2-B	66-SB2-C	67-FB	68-TB
Laboratory Sample Number			8837-01	8837-02	8837-03	8837-04	8837-05
Remarks						Field Blank	Trip Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
SEMIVOLATILE COMPOUNDS	Quantitation Limit (Aq)	Quantitation Limit (Sol)					
Anthracene	10	330		NA	NA		NA
Di-n-Butylphthalate	10	330		NA	NA		NA
Fluoranthene	10	330		NA	NA		NA
Pyrene	10	330		NA	NA		NA
Butylbenzylphthalate	10	330		NA	NA		NA
3,3'-Dichlorobenzidine	20	660		NA	NA		NA
Benzo(a)anthracene	10	330		NA	NA		NA
bis(2-Ethylhexyl)phthalate	10	330		NA	NA		NA
Chrysene	10	330		NA	NA		NA
Di-n-Octylphthalate	10	330		NA	NA		NA
Benzo(b)fluoranthene	10	330		NA	NA		NA
Benzo(k)fluoranthene	10	330		NA	NA		NA
Benzo(a)pyrene	10	330		NA	NA		NA
Indeno(1,2,3-cd)pyrene	10	330		NA	NA		NA
Dibenz(a,h)anthracene	10	330		NA	NA		NA
Benzo(g,h,i)perylene	10	330		NA	NA		NA
Quantitation Limit Multiplier			4.85	NA	NA	3.00	NA
Date of Sample Collection			1/16/91	NA	NA	1/16/91	NA
Date Sample Received by Laboratory			1/17/91	NA	NA	1/17/91	NA
Date Sample Extracted			1/21/91	NA	NA	1/21/91	NA
Date of Sample Analysis			1/23/91	NA	NA	1/30/91	NA
Instrument Used for Analysis			MS-S1	NA	NA	MS-S2	NA

NOTES: - Compound was not detected.

B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.

R Unreliable result - Compound may or may not be present in this sample.

J Quantitation is approximate due to limitation[redacted]ified during the quality assurance review (data validaiton).

UL This compound was not detected, but the quanti[redacted]n limit is probably higher due to a low bias identified during [redacted]ity assurance review.

NA Not analyzed.

CLP - TENTATIVELY IDENTIFIED COMPOUNDS - ESTIMATED CONCENTRATIONS					-page 22
SMC Environmental Services Sample Number	G4-SB2-A	65-SB2-B	66 SB2-C	67-FB	68-TB
Laboratory Sample Number	8837-01	8837-02	8837-03	8837-04	8837-05
Remarks				Field Blank	Trip Blank
Units	ug/Kg	ug/Kg	ug/Kg	ug/l	ug/L
COMPOUNDS		Analyzed Twice			
VOLATILE COMPONENTS	-	-/-	-		
Laboratory Artifact				7.7 R	-
SEMIVOLATILE COMPONENTS		NA	NA	-	NA
Blank Contaminant	2540 (3) B				
Unknown (Number of Peaks)	5290 (5) J				
Alkane	3100 J				

ORIGINAL (Red)

NOTES:
- Compound was not detected.
B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
R Unreliable result - Compound may or may not be present in this sample.
J Quantitation is approximate due to limitations identified during the quality assurance review (data validaiton).
UL This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.
NA Not analyzed.

EXTRACTABLE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS -page 23

ORIGINAL (Red)

SMC Environmental Services Sample Number			64-SB2-A	65-SB2-B	66-SB2-C	67-FB	68-TB
Laboratory Sample Number			8037-01	8037-02	8037-03	8037-04	8037-05
Remarks						Field Blank	Trip Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
COMPOUNDS	Reporting Limit (Aq)	Reporting Limit (Sol)					
Kepone	0.132	68.0	14.6 J				NA
Mirex	0.0054	18.5	82.1	6.56 J	21.3 J		NA
Quantitation Limit Multiplier			1.18	1.18	1.28	1.00	NA
Date of Sample Collection			1/16/91	1/16/91	1/16/91	1/16/91	NA
Date Sample Received by Laboratory			1/17/91	1/17/91	1/17/91	1/17/91	NA
Date Sample Extracted			1/21/91	1/21/91	1/21/91	1/21/91	NA
Date of Sample Analysis			1/24/91	1/24/91	1/24/91	1/24/91	NA
Instrument Used for Analysis			MS-S3	MS-S3	MS-S3	MS-S3	NA

NOTES:
- Compound was not detected.
B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
R Unreliable result - Compound may or may not be present in this sample.
J Quantitation is approximate due to limitations identified during the quality assurance review (data validaiton).
UL This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.
NA Not analyzed.